

960,491

# PATENT SPECIFICATION

DRAWINGS ATTACHED

960,491



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## COMPLETE SPECIFICATION

### Tipping Transport Container for Loose Materials

We, WIBAU WESTDEUTSCHE INDUSTRIE-UND STRASSENBAU - MASCHINEN-GESELLSCHAFT m.b.H., a German Body Corporate, of Kreis Gelnhausen, Rothenbergen, Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

Transport containers for loose materials are known which at the upper end face have a filling and emptying opening which can be closed by a closure means. For the purpose of emptying the containers are tipped, that is to say inverted in such a manner that the opening points downwards and after undoing the closure means the material flows out of the containers. In order to facilitate the flowing out of the material, and to ensure complete emptying of the containers, the latter are so constructed that they taper conically towards the opening.

The invention aims at improving a container of this type, that is to say one which is provided with a top opening serving for filling and emptying and adapted to be closed by a closure means, in such a manner that the conical tapering towards the opening is saved and the material nevertheless flows rapidly and completely out of the container when the latter is in the tipped position. The solution of this problem comprises constructing the container as a parallelepipedic body having substantially flat walls, while the filling and emptying opening is disposed along one top edge of the container, and is greater than half the length of the container.

Owing to the fact that the container according to the invention has throughout essentially flat walls, it is distinguished by a very simple shape which can be produced economically. For the purpose of emptying, the container is tipped to such an extent that the edge along which the opening is disposed is situated in the lowest position. In this position of the opening, the top end wall and that side wall

of the container which adjoins the opening form inclined surfaces on which the material flows towards the opening from all sides after the fastening has been undone. It is thereby reliably ensured that the container will be completely emptied within a short period of time.

Two embodiments of the invention are illustrated by way of example in the accompanying drawing in which:

Figure 1 shows a cube-shaped container in perspective,

Figure 2 the container in the emptying position,

Figure 3 a number of containers stacked one above the other,

Figure 4 another form of construction of the container, likewise in perspective,

Figure 5 the container during the emptying operation, and,

Figure 6 two containers of this type stacked one above the other.

The container illustrated in Figures 1 to 3 has the shape of a cube of which all the walls are flat, and in the upper end wall 1 is provided with an opening 2 which serves for filling and emptying and which can be closed by a closure means. The opening 2 is rectangular and so disposed as to run directly along the upper container edge 3. The closure means consists of a flap 4, which in turn is mounted by means of two hinges 5 to be rockable about the edge 3 on the side wall 6, while it can be held in the closed position by means of a bolt 7.

A horizontal tube 8 of circular cross-section, lying parallel to the opening 2, is passed through the middle of the container and is fastened to the mutually opposite side walls 11, 12 in such a way as to be open to the outside and preferably with the interposition of reinforcing plates 9, 10. From the centre of the pipe 8 four pipes 13 run out in the form of a cross, and these are likewise fastened to the side walls 6 and 15, the upper end wall 1, and the bottom wall 16, prefer-

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ably likewise with the interposition of reinforcing plates 14. Unlike the pipe 8, the pipes 13 are mounted on their respective walls in such a manner as to be closed in relation to the outside. The pipes 8 and 13 together with the reinforcing plates give the container walls such good support that they can be made relatively thin, while the container is nevertheless adequate for rough transport use.

In addition, the container is preferably provided at the bottom with supporting feet 17 of such a height that it can, for example, be picked up by the forks of an elevating stacker run under it. Finally, depressions 18 are also provided in the upper end wall 1. As shown in Figure 3, these are so disposed and constructed that when a number of containers are stacked one on the other the support feet 17 of an upper container project into the depressions 18 in the container next beneath it. Very firm standing of the stack is thereby ensured in an advantageous manner.

For the purpose of filling, the container is placed at an angle of about  $40^\circ$  on the feet lying diagonally opposite the opening 2, in such a manner that the opening comes to lie beneath the outlet of a bunker or the like, from which the container is to be loaded with the loose material to be transported. In this position dead space in the container is avoided, so that it is completely filled with the material. In order to be able to bring the container conveniently into the filling position, a corresponding swinging support or the like is advantageously disposed beneath the bunker outlet.

For transport to the destination the filled containers are placed by the feet 17 for example on a lorry. The parallelepiped shape of the containers then affords the advantage that the loading area can be fully utilized. At the destination all the containers are advantageously first lifted off the lorry, for example with the aid of an elevating stacker. They are then passed one after the other to the emptying plant and there emptied. If a specially equipped conveyor is not available for the purpose, this can be done easily and rapidly with a normal elevating stacker, approximately in the following manner. Through the pipe 8 a rod of circular cross-section is pushed the length of which is such as to extend out of the pipe at both sides. The container is then lifted by the projecting ends of the rod by means of the forks of the elevating stacker and passed to the emptying plant hanging freely on the rod. The container is there tipped by hand around the rod until the opening 2 is situated above the admission aperture of the emptying plant, for example a shaft 20. The container is now let down by lowering the forks until it rests by the end wall 1 and the side wall 6 on the upper edge of the shaft (Figure 2). In this position the end wall 1 and the side wall 6 form surfaces

each of which is inclined at an angle of  $45^\circ$  in relation to the opening 2. If the bolt 7 is now drawn back, the flap 4 opens, and the materials fall out of the container. The inclination of the walls 1 and 6 ensure that the material flows from all sides to the opening and the container is emptied rapidly and completely. The admission aperture of the shaft is advantageously of such dimensions that when the container is in the emptying position it is covered by the latter over its entire cross-section and therefore practically no dust, which is whirled up by the material falling down, passes to the outside from the admission aperture.

The handling of the container can in addition be simplified if the rod inserted into the pipe is mounted horizontally and projecting forwards on the elevating unit of the stacker. In this case the stacker is run up to the container so that the rod projects into the pipe. The container is then transported in the above described manner hanging on the rod to the emptying plant, there tipped by hand about the rod, lowered on to the edge of the admission aperture, and after emptying is taken back to the loading point by the reverse sequence of operations.

The container illustrated in Figures 4 to 6 likewise has a square cross-section and, unlike the above-described container, has a greater height in relation to its width. In addition, the upper right hand edge is cut away or omitted at an angle of  $45^\circ$  degrees so that an opening 22 (Figure 5) is formed for filling and emptying the container. It can be closed by a flap 23, which is rockably mounted on the side wall 25 by means of two hinges 24 and is held in the closed position by a bolt 27 fastened on the upper end wall 26. On the side opposite the opening, the upper end wall is provided at both corners with depressions 28, and along the side wall 29 these depressions are covered by respective plates 30. In addition, standing feet 31 are provided at the corners of the bottom.

A horizontal pipe 32 passes through the middle of the container parallel to the opening 22 and has a square cross-section; it is fastened on the side walls 35 and 36 with the aid of reinforcing plates 33, 34 in such a manner as to be open to the outside. In order to stiffen the container, the pipe 32 is connected in the middle by two vertical pipes 37 and 38 to the end wall 26 and bottom wall 46. These pipes are likewise attached to the walls 26 and 39, with the interposition of re-inforcing plates 39, 40, but are closed towards the outside. In addition, two horizontal pipes 42 and 43 run from each of the pipes 37 and 38 and are connected to the side walls 25, 29 of the container through the medium of reinforcing plates 44 and 45 respectively, being likewise closed towards the outside.

In the same manner as described above, 15

the container is filled and emptied in a position inclined at  $45^\circ$ , in which the opening 22 points either upwards or downwards. As can be seen in Figure 5, the opening then lies in each case in a horizontal plane, so that its complete inside cross-section is available for the filling and emptying operation. As shown in Figure 5, the pipe 32 is in addition advantageously so disposed that it stands on one edge when the container is in the emptying position. In this way it is ensured that during the emptying operation no material will remain lying on the pipe.

The square pipe 32 also offers the advantage that the container can be handled particularly simply with an elevating stacker, the elevating unit of which is provided with a rotating device and also with a horizontally projecting rod for insertion into the pipe. The rod is then likewise made square in cross-section and of such dimensions that it fits non-rotatably into the pipe 32. The container can then not only be transported with the aid of the stacker but also tipped into its emptying position by turning the rod with the aid of the rotating device.

From Figure 6 it can be seen that when two containers of this type are stacked one above the other, the right-hand standing feet 31 of the upper container are freely accommodated in the space provided by the oblique opening between the upper and lower containers, while the left-hand feet project into the depressions 28 in the lower container. At the same time the plates 30 serve as stops to prevent displacement to the right of the upper container, so that the latter is mounted on the lower container in such a manner as not to be displaceable in any direction. In addition, the bottom wall of the upper container then rests on the bolt 27, the height of which is therefore made such that the bottom wall lies horizontally and thus the top container stands straight. To this end, however, corresponding spaces may for example be provided on the upper end wall or on the bottom of each container.

Within the framework of the invention the containers described can be modified in various ways. Thus for example it is possible for the

hinges on which the flaps are held to be mounted not on a side wall but on the upper end wall of the containers, while the bolts may be replaced by other suitable fastening means, such as toggle clasps or turn buckles.

#### WHAT WE CLAIM IS:—

1. A tippable transport container for loose material having a top aperture which serves for filling and emptying, and which can be closed by a closure means, characterised in that the container is constructed as a parallelepipedic body having substantially flat walls and the filling and emptying aperture is disposed along one top edge of the container, the length of the filling and emptying aperture being greater than half the length of the top edge of the container.

2. A tippable transport container as claimed in claim 1, characterised in that for the purpose of forming the filling and emptying aperture one upper edge of the container is cut away obliquely or omitted.

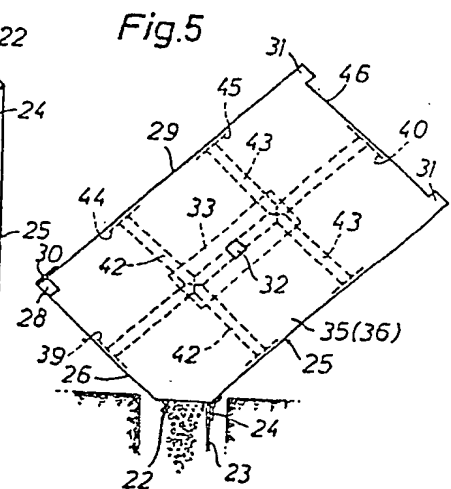
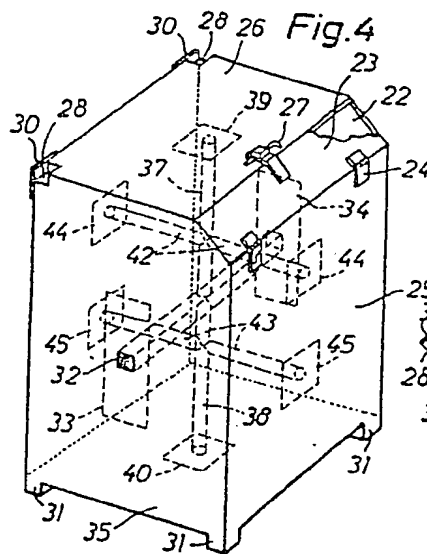
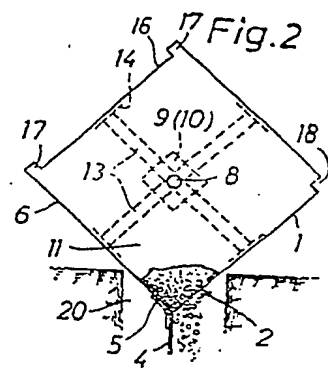
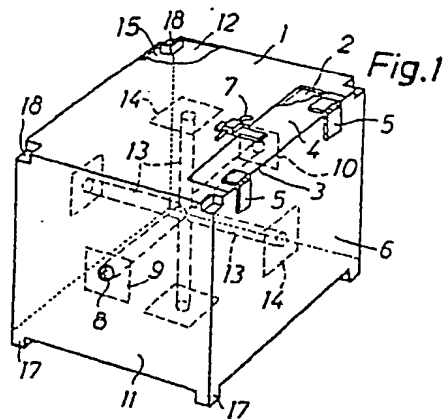
3. A tippable transport container according to either of the above claims, characterised in that the container has standing feet on the bottom and on the top end wall has corresponding depressions into which the standing feet of each upper container project when a plurality of containers are stacked one on the other.

4. A tippable transport container according to any of the above claims, characterised in that a pipe running parallel to the fitting and emptying aperture is passed through the middle of the container and is fastened on opposite side walls of the container in such a manner as to be open to the outside of the container.

5. A tippable transport container as claimed in claim 4, characterised in that the pipe has a prismatic, preferably a square, cross-section.

6. Tippable transport container substantially as hereinbefore described with reference to the accompanying drawings.

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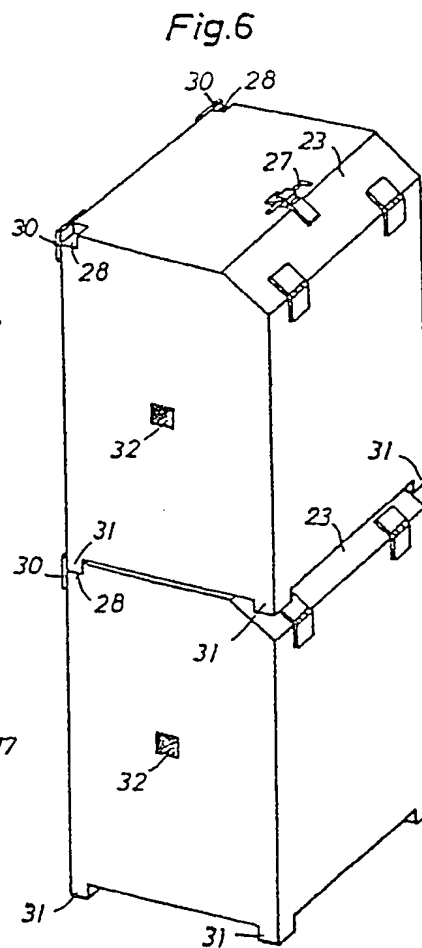
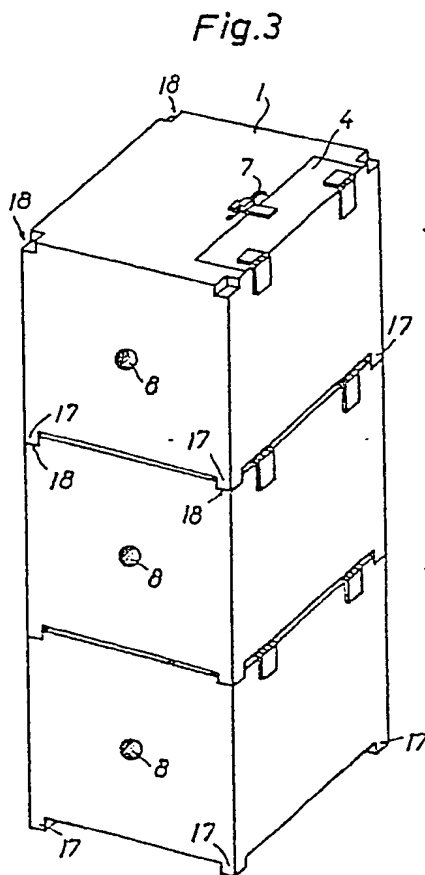
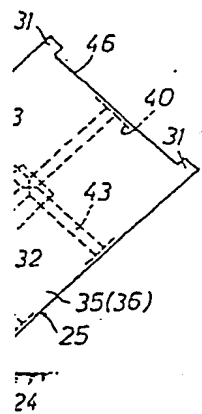
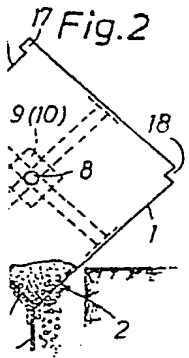


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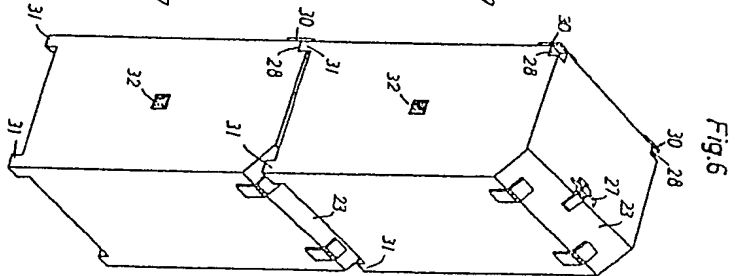
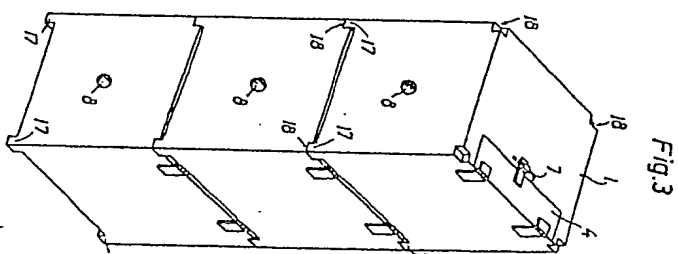
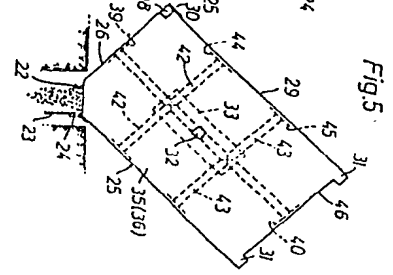
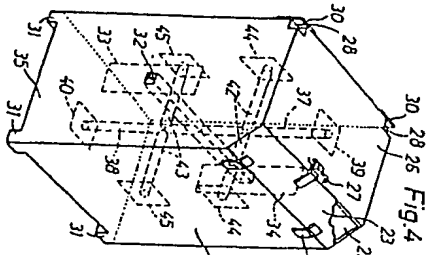
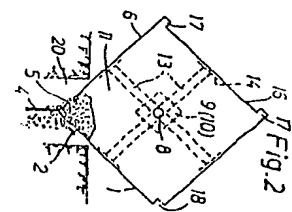
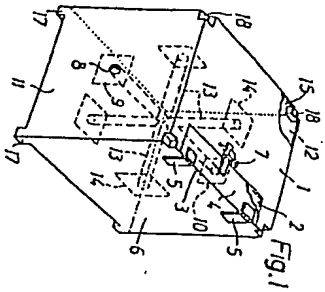
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2 SHEETS

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